

MASSAGE IN NERVOUS DISEASES.

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IV.

(Continued from page 223.)

Writer's Cramp.

UNDER this title we shall consider all affections which have been described by Benedict under the generic name of "Co-ordinatory Occupation Neuroses," without at all confining ourselves to the various forms as they occur in writers. The name "writer's cramp" has, almost since its existence, for various manifest reasons, been acknowledged as insufficient. The symptoms, for we really have only symptoms to deal with, and not a disease itself in the true significance of the term, may occur in any person who is obliged to make continuous or prolonged use of any group of muscles. These symptoms, occurring in persons occupied in various pursuits, have received the names of the occupations followed; thus we read of writer's, draughtsman's, engraver's, telegraphist's, violinist's, pianist's, blacksmith's, tailor's, sempstress', and also of photographer's and ballet-dancer's cramp. The movements employed in all these occupations are not produced by the contractions of any one muscle, but by the harmonious co-operation of several. We will, therefore, for convenience' sake, speak of writer's cramp only, but all our remarks apply with the same force to any of the so-called "cramps," as they occur in either of the above-enumerated occupations.

The word "cramp" itself is also objectionable, as the symptoms may present themselves in various forms, of which the "cramp" is only one. Benedict has classified the symptoms under the headings of spastic, tremorous, and paralytic, and these seem to us to cover the symptoms observed. Exactly where the seat of the disease is in writer's cramp, is a question which has received considerable attention, and has been the subject of great discussion, and is one which certainly cannot at present be answered in a positive or dogmatic manner. All co-ordinated movements, particularly complicated ones, can only be produced if there is no obstacle to the harmonious action of all the muscles necessary to the production of the desired act; any derangement will, according to its seat or character, be followed by an irregularity or incapacity. The various possible sites have, in this affection, been accused of being implicated. Thus, by some authors, Duchenne, Solly, Althaus, Erb, it is supposed to be of central origin, situated either in the supposed co-ordinating centres of the brain, or in the cervical part of the spinal cord. Others, Reynolds, Zuradelli, Geigel, Haupt, Meyer, Poore, Beard, etc., believe it to be of peripheral origin, and due either to an affection of the motor or of the sensory nerves.

For our purposes it is not necessary to enter into the question of the pathology or even of the mechanics of the peripheral cases at all extensively, but certainly to-day the bulk of testimony goes to prove that the majority of cases of writer's cramp, if carefully examined, will be found to be of peripheral origin. On the other hand, it cannot be denied that many cases are of central origin, and that in many also, the so-called writer's cramp is only an early symptom of some central affection of the nervous system, which might have been diagnosticated if sufficient care and attention had been devoted to it.

When we consider that the train of symptoms known as writer's cramp may be produced by a disorder of the most different parts of the nervous system, and also by the most varied causes, we can appreciate the necessity of a careful examination of every case, and, if possible, of making a

diagnosis which shall embrace more than the words "writer's cramp." This necessity becomes all the more apparent in the treatment by massage, for here in order to attain any thing like the uniform good results of which we shall speak later, it is imperative to be able to select our cases, as it is evident that a case of central origin will not be benefited by massage any more than by any other mode of treatment; and cases which are of peripheral origin, even if the central nervous system has ultimately become functionally disordered, may, nevertheless, be influenced by attacking the primary locus morbi. The very first question which we must propound to ourselves is, therefore, "Is the case peripheral or central?" If it is peripheral, what is the direct disorder? Are we dealing with a paresis or a paralysis of certain small muscles of the hand, or with a disordered state of nutrition of single muscles, by which means is produced a hypercontraction of the muscle itself or a relaxation of its opponents, and thereby an inco-ordination, or is it an early stage of a peripheral neuritis? The answers to these questions are not always easily given, and, to insure any thing like accuracy, the examination should be a very careful one.

Particular attention must be paid to the action of each muscle separately, and also to the harmonious action of the various groups. For the latter purpose the writing itself must also be studied. This is essential to the making of a special diagnosis of the muscle or muscles affected. Painful points and indurations along the course of the nerves—in fact, in the entire arm—must also be sought after.

It is unnecessary here to enter into a consideration of the physics of the various muscles employed, as has been so carefully done by Zuradelli, but, at the same time, it is well in examining a case to remember certain facts which will enable us to detect disorder of certain muscles and to more carefully direct our treatment.

In examining the method of pen prehension, which should be done first, it will be found that, if the pen is grasped tightly, it is probable that one or more of the small muscles,—the *interossei*, the *abductor* and *opponens pollicis*, the

flexor brevis pollicis, and the extensor primi internodii—are incapacitated for work, and that the larger ones are being used as substitutes. If the forefinger rises or slips off the pen, a failure of action of the first dorsal interosseous is the cause. If the phalangeal angle of the thumb gives in, it is due to a disorder of the extensor primi internodii.

The various movements of the fingers must next be watched,—the up-and-down motion, the lateral movement of the hand, etc. According to Poore, inability to keep the hand upon the paper, is due to a failure of the supinator longus.

A limitation in the length of lines or letters (to about $1\frac{1}{2}$ cm.) is generally due to a paralysis of the long extensors of the fingers, as thereby an inability to extend the first phalanx is produced. Inability to strike a loud note on the piano, or to hold the pen with the points of the fingers, is generally due to a paralysis of the long flexors, the first and second phalanges being found in permanent extension.

Abduction of the thumb, so that it falls in the palm of the hand and prevents flexion of the fingers, is due to paralysis of the abductor longus pollicis and flexor brevis pollicis.

An inability to touch the ends of the fingers with the thumb without flexing them in the second and third joints, denotes a paralysis of the abductor brevis and opponens pollicis.

The importance of examining carefully for these and similar manifestations of peripheral mischief in the muscles, and the frequency of occurrence of such disorders in the various artisan's neuroses, may be appreciated when the following statement of Poore is considered: "In every case of impaired writing power which I have seen, there has been evidence, more or less marked, of derangement of one or more of the muscles used in writing"; and he furthermore says: "The writers' cramp of text-books, in which failure of writing is the sole symptom, I have never seen."

We can fully corroborate both of these statements; all cases, whether of writer's cramp or of other artisans' cramp which we have seen, have, upon careful examination, pre-

sented evidence of peripheral disturbance sufficient to account for the failure in their work. Furthermore, the cramp was in none of them the primary and sole disturbance, and all of our patients were not only unable to perform their own special work, but were also unable to execute other work which entailed similar movements and similar use of the affected muscles. It is not essential that this peripheral disorder be dependent upon a paralysis or a paresis; but it may, and we believe it to be so in very many cases, be due to a faulty innervation of single muscles or groups of muscles, which causes either a failure in their action while the other muscles still exert their functions normally, or causes them to enter into a state of tonic contraction whenever an unusual amount of work is required of them.

The electrical examination will also, in many of these cases, indicate the affected muscles, showing a difference in the reaction from that of the corresponding muscles of the other hand—either an increased or a decreased irritability. Stress is also laid upon the electrical examination by Zura-delli, Erb, Gowers, Poore, and others.

Another indication of disordered nutrition of the muscles is fibrillary tremor; it is sometimes found at a very early stage, and even before any marked subjective symptoms are present.

Treatment.

Canstatt's words, written over forty years ago, "Much has been tried, nothing has succeeded," could, until a few years ago, have been repeated, and fully express the results of treatment in writer's cramp. Here and there a cure was effected by means of one remedy or other, but the great majority of cases remained unimproved.

Since massage has been systematically used in the treatment of this affection, the cures attained have far outweighed the failures. As to whom is due the honor of first recommending massage in the treatment of writer's cramp, there is some difference of opinion. Meding, over thirty years ago, used it empirically; Erb, in 1874, in the first edition of his text-book on disorders of the nervous system, speaks of "Gymnastic and massage for the cure of writers' cramp";

and Douglas Graham, in 1877, was one of the first to direct closer attention to this means of treatment.

The first reported case of cure by means of massage was published by Rossander in 1873, but, unfortunately for the claims of massage, another remedy was simultaneously employed—the subcutaneous injection of strychnine,—and for this reason it is not possible to ascribe the cure to the use of the massage alone. The massage treatment consisted in two séances daily; the muscles of the thenar and hypothenar eminences, the interossei, and the lumbricales were rubbed successively. At the same time the muscles of the thumb, of the small finger, and of the forearm were percussed with a wooden cylinder. The patient was cured after four weeks of treatment.

The next case is one by Gottlieb.

Patient, a female æt. fifty-two, came to Gottlieb August 17, 1874; had always been well until 1863. She was accustomed to write as much as nine hours a day. At this time she exposed herself to severe cold. Two years later she suddenly became incapable of writing. The pen falls from her hand, and she is unable to resume her work. Since then the right index constantly refuses to act in writing or in performing any analogous work. Then the middle finger became affected; still being able to use the thumb, she continued to write with it and the two last fingers. She then endeavored to use her left hand, and this in time became affected, but to a much lesser degree. Both hands presented a slight degree of œdematous swelling. She was treated by massage. Thirty-seven séances in all were used. Complete and permanent cure.

In 1877, Douglas Graham republished these two cases and another by Drachman, which latter, however, we do not consider as one of writer's cramp, and at the conclusion made the following remarks: "When sufficient time for rest has been allowed, and in the absence of spasm, or spasm of the flexors alone being present, I should think it might be useful to add resistive motion, so as to bring systematically into more powerful action the opposing and less-used extensors, which would tend to restore harmony

of action by a counterbalancing distribution of will, nerve, and muscular effort." There is as much of value contained in this paragraph as in all that Wolff, the self-styled inventor of a "method" of cure, has written.

Since then others have also, in a few words, advocated the use of massage in these affections, but it was not until after Schott's publication in 1882, that particular attention has been devoted to this mode of treatment. Wolff, who claims to be the originator of the method, is a writing-master, and as such, according to Stein, sees many children and adults with poor handwriting. Among these naturally there are some affected with writer's cramp, who lay the blame of their poor writing to their incapacity, whereas it is really due to their disease. Wolff, therefore, endeavored to cure them "by a peculiar system of writing-instruction, which he combined with massage and gymnastic exercises, passive and active, applied to the muscles of the arm."

Beyond any doubt Wolff has treated and cured more cases than any other single person. For that, reliable evidence is present; but he has done absolutely nothing towards communicating his mode of treatment to others. In an article published in 1884 in the *N. Y. Med. Record*, p. 205, vol. i., he says, in speaking of the priority claims of the Drs. Schott:

"Both gentlemen again and again questioned me about my method, but they never received another response to their numerous inquiries than that the same consisted in a peculiar combination of massage and gymnastics." And in a small monograph, "The Cure of Writer's Cramp, etc.," published in 1884, he evades description of the method by the same means as he claims to have employed with the Drs. Schott.

Certainly, whether Wolff or Schott is the originator of the method, to Schott belongs the credit of having communicated it to others, and Wolff is entitled only to the thanks of the patients he has cured, and not to those of physicians or scientists, for he has not advanced the cause of scientific knowledge one iota, but on the contrary has only endeavored to obscure and to hamper it. Schott's

mode of treatment consists in a combination of gymnastics and massage. The gymnastics consist of movements performed by the patient alone, and movements performed with the opposition of the operator.

The first are performed by the patient during from twenty to thirty minutes, rarely for forty-five minutes. The first movements are gymnastics of the fingers, extension, flexion, abduction, and adduction, the thumb being exercised separately; thereupon the same four motions are executed at the wrist joint, then extension and flexion of the forearm, and ultimately the arms themselves are exercised in the same manner and are to be lifted over the head. Each single exercise is to be performed from six to twelve times. After each motion a pause is to be observed.

The opposed movements are to be carried out in the same manner, except that the operator must carefully resist their executions as though he were endeavoring to force the patient to perform a motion just the reverse of his intentions. Regularity of pressure is to be observed in this, so that the same amount of force is always used, and that the pressure does not vary in intensity from moment to moment.

The time to be devoted to these opposed movements is to be the same as that for the unopposed ones. According to the intensity of the affection the exercises must be repeated two to three times daily. The massage itself consists of two parts—nerve and muscle massage. The nerve massage is effleurance along the course of the nerve trunks, the median, ulnar, and radial, going upwards to the axillary and cervical plexuses. This effleurance lasts about ten minutes. Following this is the muscle massage. This consists of petrissage, beginning with the hand and ending at the shoulder. Duration same as last movement. One sitting a day has always proved sufficient.

Schott says in from two to three weeks improvement is noticed. The treatment must not be interrupted then but must be kept up for at least six to eight weeks, which time is necessary to attain a complete cure. During the time of treatment the occupation of the patient must be discontinued. Schott has thus succeeded in curing all the neuroses which

came under his treatment, mostly pianists, and in none of them has any return been observed.

Wolff's method, according to *Stein*, for he is the only one who has given any thing like a detailed description of Wolff's procedure, differs from the preceding in so far that he makes use of "a peculiar method of writing-instruction" in addition to the gymnastics and massage.

And he says, furthermore, "the peculiarity of the method consists in that fact, that Mr. Wolff, in consequence of years of practice and special treatment, understands how to carefully isolate those muscular groups which require a special gymnastic treatment, either with his hand or by means of rubber bands, in a way that we electro-therapeutists, even with the most minute electro-diagnostic examination, are unable to do."

The accompanying illustrations taken from this article

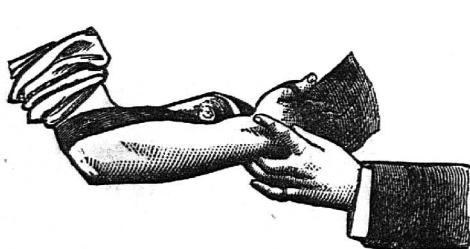


FIG. I.



FIG. II.

will give an idea as to the manner in which these bands are applied.

Fig. I. shows the patient, on whom, by means of tightly drawn rubber bands, certain muscular groups have been isolated, in the act of having passive opposed movements performed.

Fig. II. shows the same in the execution of active movements.

Wolff has certainly achieved remarkable results by his mode of treatment, and that his patients are permanently cured we must believe, for we have the evidence of men like Billroth, Esmarch, Wagner, Bardeleben, Bamberger, Hertz, Benedict, Nussbaum, Charcot, Vigouroux, and Stein; and only recently De Watteville, of London,

has published cases which have been completely cured by Wolff. From 1877 to 1882, Wolff has treated in all 277 cases of writer's cramp and similar affections—245 were writer's cramp, and of these 132 were radically cured, 22 improved, and 91 without result; 32 cases of pianist's, violinist's, telegrapher's, and painter's cramp—of these 25 were cured. In all, 157 cured, 22 improved, 98 not cured.

No other single person can hope to attain such results from want of material; but Wolff is not alone in obtaining good results; for Weiss, Podrazky, Zabludorosky, Schreiber, and Douglas Graham all report good results in the use of massage in writer's cramp.

The results obtained by us have been excellent ones, and, although the number of cases is necessarily a limited one, still it is sufficient to show that there is no secret in the method, and that good results can be obtained by any one; all that is necessary being perseverance and thoroughness, and that the "peculiar" combination and the "peculiar" system of writing instruction is not essential. As model for treatment we made use of Schott's description.

The patients were examined carefully, to localize, if possible, the exact seat of the affection: cases which were not clearly of peripheral nature were not treated at all. Particular attention during the massage was paid to the interossei, and to all the muscles of the thumb. The massage was carried out in the manner described by Schott, the idea to be kept in mind being that, by means of the exercise and massage, the weakened muscles are to be strengthened and their nutrition improved.

In order to thoroughly manipulate the interossei and lumbricales, the hand of the patient sitting face to face with the operator must be taken by him into both hands, and the metacarpal bones separated from each other as much as possible, and then moved upward and downward. The small end of Granville's percuteur will also be found very serviceable in acting upon these small and deeply-seated muscles.

The larger muscles can be manipulated as described under the general head of *Technic*—*petrissage* and *massage à friction* being principally applied.

The most important part of the treatment, however, consists in the active and passive movements, with and without opposition.

For the execution of the active movements we have laid down the following rules to be observed by the patient. The movements are to be executed :

- 1st. As slowly as possible.
- 2d. In a certain rhythm.
- 3d. With a certain amount of effort.
- 4th. Care must be taken not to over-exert the muscles.
- 5th. The movements must be executed three times daily, and each movement carried out from twenty-five to two hundred times.

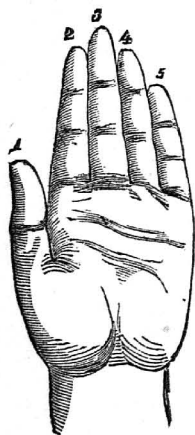


FIG. III.

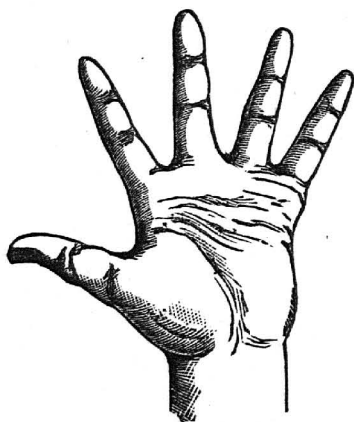


FIG. IV.



FIG. V.

Every patient is first taught the following positions of the hand by heart :

- 1st. Fingers extended and approximated (Fig. III.).
- 2d. Fingers extended and separated (Fig. IV.).
- 3d. Fingers flexed at right angles to the hand and approximated (Fig. V.).
- 4th. Same, but fingers separated.
- 5th. Fingers flexed at knuckle (first phalanx forming straight line with hand), fingers approximated (Fig. VI.).
- 6th. Same, fingers separated (Fig. VII.).

7th. Fingers flexed upon the palm and approximated (Fig. VIII.).

8th. Same, but fingers separated as much as possible.



FIG. VI.



FIG. VII.



FIG. VIII.

After the patient has learned these perfectly and by number, the following exercises are given him to exercise at home.

1. The fingers are to be brought from 1st to 2d position, one after the other (muscles exercised are the interossei, volares et dorsales and the external fibres of the extensors).

2. Fingers to be brought successively from 1st to 3d position (muscles exercised are the flexor digit. commun., sublim., and profund., principally the former). The lumbricales and interossei also assist in this movement.

3. Fingers to be brought from 1st to 5th position (muscles exercised, flexors, principally the flexor profundus perforans).

4. Fingers from 1st to 7th position (muscles exercised are the flexors equably and the four lumbricales).

5. Fingers from 2d to 3d position (muscles exercised are the same as in No. 3, together with the interossei.)

6. Fingers from 2d to 5th position.

7. From 2d to 7th position.

8. From 3d to 4th position.

9. From 3d to 5th position.

10. From 3d to 7th position.

11. From 4th to 6th position.

12. From 4th to 8th position.

13. From 5th to 7th position.

14. From 6th to 8th position.

Reversing these movements will, of course, exercise the antagonists; thus, in exercise 2, if instead of commencing with the 1st position and bringing the fingers to the 3d, we reverse matters and bring them from the 3d to the 1st, then, instead of bringing the strain upon the flexors, we do so upon the extensors.

These exercises must be chosen with care and given to the patient for execution at home, one at a time, care being taken that they are well understood and satisfactorily executed.

The following opposed movements can of course only be executed with the aid of the operator.

The opposed movements which are the most serviceable are the following:

1. Hand of patient in position 1, each finger is successively to be brought into position 3 while the operator endeavors by counterpressure to prevent it.

2. Fingers in position 3, operator endeavors to bring them into position 1 while the patient prevents it.

3. Fingers in position 1, to be brought to position 2 while operator opposes.

4. Fingers in position 2, to be brought to position 1 by operator while patient opposes.

5. Fingers in position 4, to be brought to 3 by operator. Fingers in 3, to be brought to 4 by patient.

6. Fingers in position 6, to be brought to 5 by operator. Fingers in 5, to be brought to 6 by patient, operator opposing.

In order to enable the patient to perform certain opposition movements at home and at the same time to be sure that a certain amount of equable opposition is being used, we have constructed the following apparatus. The movements which are to be executed are simply those of extension and flexion, and the opposition is furnished by rubber bands.

The apparatus consists of a metallic bracelet, the inside of which is padded. One end of it consists of a ratchet,

which admits of increasing the size of the bracelet to fit any arm, and at the same time allows it to be tightly fastened. Upon one side of the bracelet, the top or bottom as the case may be, are fastened five brass pegs. Rubber bands are buttoned to these by means of leather end-pieces. The other end of the bands terminate in leather finger-coverings, which are slipped over the fingers of the hand. The bracelet is always to be adjusted just above the joint, and tight enough to keep it from slipping. If the extensor muscles are the ones [to be exercised, the

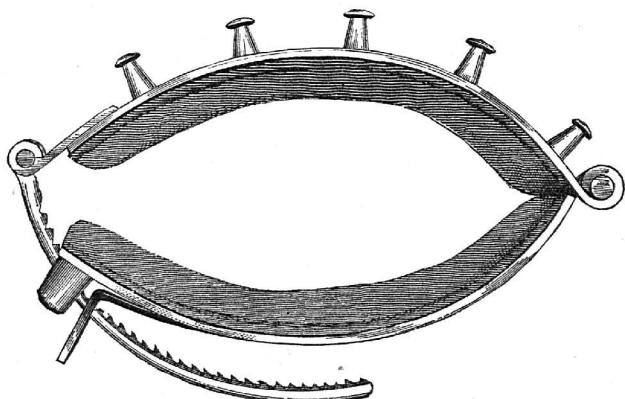


FIG. IX.



FIG. X.

bracelet must be so placed as to allow the pegs to be at the bottom. Care must be taken that the apparatus be placed on the arm in pronation for flexion movements, and in supination for extension. The kid fingers are then slipped over the fingers of the hand, and the elastic bands attached to the pegs. These elastic bands must be chosen for each case, and frequently of different strengths for the various fingers. If the flexors are to be exercised, the bracelet is applied with pegs pointing upward, and the bands then adjusted. The opposition is thus furnished, and the patient can execute the movements at home (Figs. IX. and X.). The

thumb must always be exercised separately. For opposing abduction, the band is brought from the inside of the thumb over the palm around the ulnar border of the hand and fastened to the proper peg on top. For opposing adduction, the bracelet is fastened with the pegs pointing downward. The rubber band is then brought over the back of the hand around the ulnar border and fastened to the desired peg below. The question whether patients afflicted with one of these artisan's neuroses must give up their employment during the time of treatment, is one which must be answered in the affirmative for all except writers, and these can, by means of an apparatus designed by v. Nussbaum, continue writing during the time of treat-

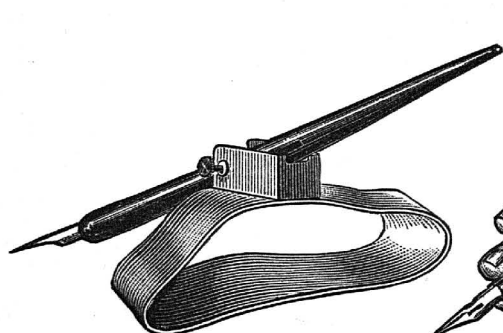


FIG. XI.

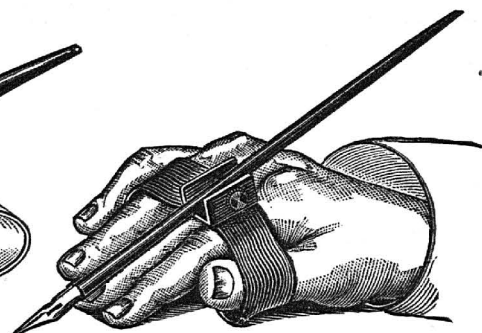


FIG. XII.

ment. In fact, the more they write with the apparatus, the more they hasten their recovery; v. Nussbaum taking the idea as a basis, that in writing, the flexors and adductors of the fingers are almost exclusively employed, and that the cramp is produced by over-exertion of these muscles, therefore the latter can be avoided by employing the antagonists—the extensors and abductors—in all writing. The apparatus constructed to effect this consists of a thin, oval, hard-rubber ring, of about two centimetres in width (Figs. XI. and XII). This ring is somewhat convex above, and is made to fit over the first four fingers (thumb, index, middle, and ring). It is passed over these fingers, the small finger remaining outside. Upon the upper surface of the ring is a movable pen-holder, which can be fastened in any

position by means of a screw. The ring must be chosen somewhat wider than the fingers to be surrounded by it. In order to keep the apparatus from sliding off the hand, the patient is obliged to keep his fingers forcibly abducted, the thumb pressing upon one side and the ring-finger upon the other. Thus the abductors and the extensors are the muscles used. For persons who are obliged to keep to their business during the course of treatment, the apparatus is invaluable; as after a very few hours of practice they can write plainly and legibly and without any exertion, and, as already stated, far from having any deleterious effect upon the results of the treatment, it may be looked upon as an ingenious adjuvant.

The following cases have been treated by us in the manner described above.

CASE I.—Nov. 1, 1883.—P. W. S. æt. forty; lithographer; has always been well. He is a draughtsman and lithographer by profession and was considered very expert in his line. Always worked very hard, generally working from eight to ten hours a day, and frequently spending his evenings in writing. About two years ago he experienced a gradual and increasing difficulty in executing his work. When drawing or writing he would have a dull, tired feeling in the entire hand, and a feeling of pain in the thumb and index finger.

The difficulty in writing and drawing increased until he was unable to work for more than half an hour at a time. Then he was unable to keep his thumb upon his pen. It slipped from it and became flexed upon the palm of the hand. Soon this occurred whenever he attempted to write. He had been unable to do any work whatsoever for over a year. Drawing, engraving, or writing were absolutely impossible.

Electrical examination showed reduced excitability to both currents in the flexor pollicis brev. and the abductor longus pollicis.

The first and second dorsal interossei were atrophied. There was pain upon pressure along the course of the radialis.

The treatment by massage and gymnastics was begun on Nov. 4, 1883, particular attention being directed to the affected muscles.

V. Nussbaum's bracelet was used for writing, with the result that after a day's practice he was able to carry on his entire correspondence by its aid. He attempted to use it for drawing but did not succeed as he could not make his movements sufficiently delicate. The treatment was carried on daily for four weeks in the manner described. At the end of this time he considered himself well, but as there was still pain upon pressure and reduced electrical excitability in the muscles, he was advised to continue treatment. After two further weeks he resumed his former occupation, and as a proof of his ability and gratitude, his first work was a crayon portrait of ourself. He has since then remained perfectly well, and has not lost a day's work, although he is more careful not to overwork himself than formerly.

CASE 2.—Sept. 9, 1885.—J. R., æt. twenty-eight; book-keeper. Family history very neurotic. Father had paralysis agitans when he died at age of sixty-four. A sister of his father has epilepsy. One brother in the insane asylum. Patient was always very nervous and easily excited. Frequently had cramps of various groups of muscles.

At the age of eighteen, while preparing for an examination, he had a great deal of writing to do, and finally broke down under the strain. He says for months he was unable to write at all. Had a painful, tired feeling in the entire right arm, up to the shoulder. This, however, in consequence of rest got better, and he was able to take a position as bookkeeper. He was then well until age of twenty-six, when the same symptoms again set in. They grew so severe that as soon as he had written a few words, his fingers began to tremble, and then the pen would be tightly grasped, the fingers entering a state of tense contraction. This state of affairs had lasted for nearly two years, when we saw him. During this time he was unable to do any work at all. Upon examination the entire hand seemed cold and weaker than the left, the entire nutrition

of the arm being a diminished one. The muscles particularly affected were the flexors, and the patient found it difficult to hold the pen firmly. When he had, however, by a severe effort, managed to write a few words, the flexors contracted spasmodically, drove the point of the pen into the paper, and put an end to any further attempt at writing. The first specimen (Fig. XIII.) shows this very well, and is all that he was able to write at that time. The second specimen (Fig. XIV.) was written after ten days' treatment and is also the entire amount. The third is the last part of a dictation of a page of note-paper, written after three weeks of treatment (Fig. XV.). The fourth is the last part of a dictation of a page of note-paper, written after six weeks' treatment (Fig. XVI.). The patient has since then remained perfectly well.

CASE 3.—Patient, female æt. thirty; piano teacher. Has devoted almost her entire life to the study of music, and has, from her fifteenth year, rarely spent less than six hours a day at the piano. At the age of twenty-eight she found that her left hand, which had formerly been as thoroughly developed as the right, and possessed the same amount of mechanical dexterity, was growing weak. She attributed this to an insufficient amount of practice, as she was then teaching a great deal and practising less than usually. She attempted to make up for this by increased attention and playing until very late at night. The more, however, that she played, the worse did her hand feel. She then had drawing pains along the entire arm, and a feeling of heaviness.

The principal trouble seemed to be in raising the fingers from the keys and in stretching any thing over an octave. This grew worse gradually, and she was ultimately obliged to give up playing entirely. When she came under our treatment, in October, 1884, she had not played upon the piano for over six months. Upon examination, it was found very difficult to localize the affection in any particular set of muscles, but the interossei and the extensors were, from the history, supposed to be specially implicated, and the treatment addressed to them particularly. After

New York, *Sept* 1883

Rp.

Joseph
Rathen

162
Stolz

I. (FIG. XIII.)

der Muskel ganz
für sich den Körper
bewegen, wenn
mitgeteilt wird daß
schon nach
einigen Stunden bald
schon und deutlich

III. After 3 weeks. (FIG. XV.)

New York
Charles in Cincinnati
Jesse Fisher in Princeton

II. (FIG. XIV.) After 10 days' treatment. (Fac-simile of handwriting Case 2.)

dropplygð gæmuf. Þrils ást.

IV. (FIG. XVI.) After 6 weeks. (Fac-simile of handwriting Case 2.)

eight weeks of treatment she began playing again, but still felt a weakness in her hand, very much the same as when the affection first began. She, however, kept on with the gymnastic exercises for several weeks longer, and then considered herself entirely well. She has since then remained well, but says that her left hand is not as reliable as it formerly was.

Besides these three cases we have had two more treated by this means, the one a stenographer the other a merchant. These cases present nothing particular of interest: the one is still under treatment, and the other is apparently cured; but the time is still too short to be able to say if it is permanent or not.

The number of cases is too small to draw any deductions from them, but they certainly show that these cases, if properly selected, can be cured, and all that is necessary is massage and gymnastics, which are not in any way "peculiar," and without the special knowledge of the mechanism of writing and the writing calisthenics, which Wolff claims are an essential part of his "method."